

**CORRELATES OF READING READINESS  
IN KINDERGARTEN CHILDREN**

**By**

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## **ABSTRACT**

The general purpose of this thesis was to examine certain variables considered to be associated with reading readiness in kindergarten children. Twenty-four children from a parent-funded parochial school in St. Catharines, Ontario were examined in this study.

The children's reading readiness level, measured by the Test of Early Reading Ability (TERA) and by teacher's ratings was correlated with various cognitive variables. These variables consisted of a rough index of intelligence as measured by the Peabody Picture Vocabulary Test - Revised (PPVT-R) Form M, mean length of utterance (MLU), the sum of relative, subordinate and coordinate clauses, the number of core statements children make when telling stories and a memory test. All but the memory test related to at least one measure of reading readiness. Although the memory test did not correlate significantly with reading readiness, the children appeared to be sensitive to the stimulus set size in terms of their study time. In addition, interruption in the interval between studying the stimuli and the recall test had a negative effect on performance and set size had a substantial effect on recognition performance.

The educational implications of these correlates of reading readiness are discussed as well as the implications for future research.

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## CHAPTER ONE

### INTRODUCTION

The concept of reading readiness has been the topic of much debate and controversy. A universal view does not yet exist concerning what is involved in reading readiness, whether reading readiness can be taught, and when reading readiness occurs.

Although the notion of reading readiness exists, Blanton (1972, cited in Hittleman, 1978) suggested that there is little known as to what ought to be taught as part of a readiness program and when it can be taught. Furthermore, he stated that both the characteristics a child needs in order to fully understand a given task and the specific characteristics a child has when ready to learn a given task also are not fully understood. As a result, there is little agreement as to how a child lacking in these characteristics can be instructed in order to meet those needs. Moreover, discrepancies exist as to the most appropriate instructional method.

The teaching of reading has long been viewed as a separate entity from writing, speaking and listening. This notion has changed somewhat with the emergence of the language-experience approach to teaching reading; however, what needs to be resolved is to what extent these facets of communication are related. This is important in that many approaches to teaching reading deny the relationship simply by separating them.

As the following review of literature points out, the understanding of the skills and abilities necessary in the beginning stages of reading is of such an equivocal nature that several questions need to be addressed.

### Historical Overview

The concept of reading readiness, although not termed as such, dates back about 200 years. Rousseau (1762, cited in Downing & Thackray, 1972), in his book, *Emile*, believed that education ought to be directed toward the child's stages of development. In *The Education of Man*, Froebel (1887, cited in Downing & Thackray, 1972) suggested that the child's development is an ongoing process, a statement which supports Downing & Thackray's (1972) concept of readiness. Pestalozzi (1898, cited in Downing & Thackray, 1972) supported this view in his book, *How Gertrude Teaches Her Children*, through the belief that education ought to work simultaneously with children's stages of development, in that they should be congruent with each other. The importance of the developmental level of the child seemed to be of greatest concern at that time. However, little appeared to be known about what these stages were and therefore what could or should be taught, and when.

Dewey (1898, cited in Downing & Thackray, 1972) suggested that a child should not be exposed to print other than incidentally, before the age of eight. Based on this 19th century knowledge of the physiological nature of the child, Patrick (1899, cited in Downing & Thackray, 1972) supported Dewey's concept by suggesting that reading and writing should not be taught in the primary school years. In support of this theory (which implies that all children are the same), G. Stanley Hall (cited in Durkin, 1976) believed that the characteristics of an individual are genetic, thus ignoring environmental influences which included such things as experience. Hall, in 1904, wrote that people must go through set stages of development and that these stages always occur in the same order. Arnold Gesell, who studied with Hall, also believed that growth and development occurs in set stages and the child would only move to the next stage after maturation. Further, he believed that the individual's environment plays a role in development; however, this was not viewed as a significant factor (Durkin, 1976).

In 1925, in the *Twenty-fourth Year Book of the National Society for the Study of Education*, the term 'reading readiness' was first used. As well as describing this concept, some methodology was described for detection and treatment of lags in readiness (Downing & Thackray, 1972). Because the concept, that children must reach a certain stage in their development in order to be ready to learn to read, was very vague, studies were conducted in order to determine when this stage occurred. In 1925, Arthur (cited in Durkin, 1976) conducted a study with results that suggested that children needed to reach a mental age of 6 to 6.5 years in order to achieve success in grade one.

In order to determine the developmental level of the child, a measure was needed. In the late 1920's, reading readiness tests were developed and included questions to assess vocabulary development, and auditory and visual discrimination. These usually were written group tests. At the end of the testing, the school was able to identify each child's strengths and weaknesses; however, rather than doing this, schools mainly tried to determine whether or not a child was "ready" (Durkin, 1976). As a result of this, it was found that most first grade children were not ready to learn to read and in the 1930's, reading readiness programs were developed. This was largely due to the influence of Gesell's theory. Rather than utilizing a readiness program for those children who needed it, generally it was felt that all children could benefit from this type of program, regardless of their readiness level (Durkin, 1976). Consequently, although the child's readiness level could be determined through testing, this information was essentially ignored in favour of a program that was taught to all children.

In response to the universal use of readiness programs, concern arose as to the timing of the teaching of reading. In 1931, Mabel Morphett and Carleton Washburne (cited in Durkin, 1976) published an article in which they supported Arthur's views that suggested that children need to reach a mental age of 6 to 6.5 years in order to

succeed in Grade one. Morphett and Washburne stated that difficulties in reading can be decreased if the teaching of reading is delayed until the child reaches a mental age of 6.5 years. They proposed that mental age was a better indicator of a child's reading progress than I.Q. They referred to I.Q. as a combination of mental and chronological ages and found that mental age alone was highly correlated with reading readiness. Morphett and Washburne (1931, cited in Downing & Thackray, 1972) initiated the trend of the study of reading readiness which predominated until about 1938-1940, when the focus extended to readiness at all stages in child development. At that time it was believed that reading readiness involved not only the child being at the readiness level to begin reading, but that each new skill to be learned in reading required some readiness level. In other words, learning at any stage of reading required some knowledge and skill prior to learning the new skill. For example, if a child was to be taught phonics then he or she must first have had some knowledge of the letters of the alphabet. Similarly, if a child was to be taught story grammar (or the typical sequence of events in stories), he or she must first have had some level of understanding of the separate components of a story.

Objections to the concept of mental age were initiated by Arthur Gates in 1936 (cited in Durkin, 1976). Supported by research, he found that rather than relying on mental age, the instructional method was the determining factor in reading readiness. The literature suggests that this hypothesis was not widely accepted until the post-Sputnik era. Rather, in the 1940's and 1950's, the view of readiness remained very much like that of the 1920's and 1930's.

Up until the launch of Sputnik in 1957, the schools supported the notion that reading instruction should not occur in kindergarten and only a reading readiness program ought to be taught in grade one. Change in this thinking occurred primarily in the educational revolution that ensued after Sputnik. The belief was now that children ought to be taught more and earlier. Attention was focussed on

psychologists who spoke about the importance of the early years, and the young learners' potential (Durkin, 1976). Some of the more important changes included a shift in emphasis from the importance of the child's heredity to the role the environment plays in child development. This included concern for the child's growth and development which resulted in a new emphasis on the child's learning and teaching environment rather than the child's maturation. Along with this, the child's cognitive development was deemed important, and for the first time, so were the child's pre-school years (Durkin, 1976).

Because of this new emphasis on the pre-school years, the previous concept of reading readiness was then criticized. The result was that reading readiness instruction was moved from grade one to kindergarten. However, there was virtually no research that aimed to determine the best time to begin teaching reading. This was primarily due to the fact that although the timing of the teaching of reading readiness skills had changed, the practices remained the same. This was further confounded by the fact that although some schools introduced reading in kindergarten, others still taught some reading readiness skills in grade one (Durkin, 1976). Clearly, these variations in practice suggested that research needed to be conducted in order to fully understand the issue of timing in teaching reading. Although not addressing the question of when to begin teaching reading specifically, Jerome Bruner, in 1959 (cited in Durkin, 1977), introduced his theory that any subject can be taught in some way to any child at any stage in his or her development. What happened was that people often misused his statements and consequently it fostered a "wishful thinking" attitude about the young child's learning capabilities. Both Hunt and Bloom attempted to answer some of the controversial questions about the young child. In 1961, Hunt (cited in Durkin, 1977) published *Intelligence and Experience* in which he described earlier research and hypothesized about the importance of the young learner's potential. Hunt's work often was seen as support for the notion of



teaching more to children and earlier. In 1964, Bloom (cited in Durkin, 1977) published *Stability and Change in Human Characteristics* in which she also looked at earlier research, and suggested that the most rapid period of development in children is the first five years of life.

At the same time, there was growing concern for the socially disadvantaged child, and it culminated in Project Head Start. Disadvantaged children were placed in this program in order to give them the "head start" they needed to succeed in grade one. It provided both social and educational opportunities in order to break the generational poverty cycles (Morrison, 1984). According to Durkin (1977), it is very likely that this program was started in support of the theories of Bruner, Hunt, and Bloom. Durkin suggested that problems arose in this concept, however, because of a general lack of knowledge about early childhood education and because few good studies had been completed.

Because of this lack of knowledge of the young child, attempts were made to answer the question of what to teach children and when they ought to be taught. In the 1960's, new emphasis was placed on the concept of reading readiness. This was due to the interest in the teaching of reading, and its relationship to the slow progress that children made in school. In answering the question of children's slow progress in school, Diack (1960, cited in Downing & Thackray, 1972) suggested that the teaching of reading had been delayed to such an extent that children were more than ready to learn and therefore became bored. Again the question of timing was addressed, although not answered.

#### Definitions of Reading Readiness

Several definitions of reading readiness have been proposed. According to Downing and Thackray (1972), readiness refers to the stage when children learn to read with ease. How a child arrives at this readiness stage depends either on his/her maturity level or whether he/she possesses the skills necessary to proceed to the next

developmental level. Readiness does not stop in the primary grades, but is a concept which can describe the learner at any stage of development. In support of this, Hittleman (1978) suggested that, at each level of development, the child possesses some level of understanding of the reading process and therefore is ready to learn something. This implies, then, that the reading process is ongoing and a child never really leaves the readiness level, since readiness means, according to Piaget (cited in Hittleman, 1978), having the skills and knowledge needed for the next stage of development.

Based on Ausubel's general description of readiness, Durkin (1976) proposed that reading readiness is the extent to which a person is able to learn, in relation to what is required by the specific learning task. She suggested that this limited ability at any point is due to the child's development, heredity, or as a result of what he/she has learned. Further, what the teacher does in terms of methodology and materials will have a great effect on what learning to read requires of the child. Finally, she stated that because each learning task is different, a child's ability to learn will vary with each specific task and therefore his or her readiness level will be different for each task.

A. Bullock (1975) supported Durkin's view; he hypothesized that reading readiness is different for each child, and consequently, there is no specific age when all children are ready to learn to read. He noted that some cautions, however, should be exercised in the timing of teaching reading. If it is taught too early, it could result in frustration, and a general negative attitude to reading. Questions also arise as to whether this causes reading difficulties. Further, if the teaching of reading is not taught early enough, the values of reading are being denied.

#### Characteristics of a Child at the Beginning Stages of Reading

Some characteristics of a child who is ready to learn to read have been described by both Durkin (1977), and Bullock (1975). In 1958, Durkin reported that reading

prior to the age of six was thought to be detrimental to children, and was therefore often discouraged. Authorities suggested that children would either run into difficulties when school began, or that it would not help them later on in school. In contrast to this, however, Durkin suggested that children who begin reading early have a natural tendency to become interested in print. An example of this would be children requesting the help of others to read frequently seen words in their environment. Other characteristics that describe these children's families include an environment where written and verbal language are in abundance, numerous writing materials are available as well as opportunities for activities with others that include reading, and children's inquiries are discussed and/or answered.

Bullock (1975) stated that readiness does not occur naturally in all children. He suggested that some children need to be guided toward this level of readiness. Some characteristics of a child who is ready to learn to read include general confidence at school, a good command of the language, interest in new things (including attempts to read what is in his/her environment and requests for help in reading these things), and general enjoyment of books.

Although not supported by research, Stewart (1985) described a list of characteristics of a young child at the pre-reading stage. In support of what Bullock and Durkin have stated, Stewart suggested that such things as book orientation in which children are aware of print, directional awareness of books, and sequencing are necessary; however, she stated that they are not reading readiness skills but rather, beginning reading skills. Further, she accused teachers of over-emphasizing oral language rather than showing the relationship between written and oral language.

Further supporting the above hypotheses, Snow (1983) suggested that some very important similarities exist between reading and language. She stated, as a result of her research findings, that reading ability correlates highly with children's

vocabulary level. This was further supported by her findings that children with reading disabilities also show developmental lags in oral language (Bannatyne, 1971, cited in Snow, 1983).

#### Contributing Variables Cited in the Literature

According to Downing and Thackray (1972), there are conflicting views in the research literature regarding general maturity and its relationship to reading readiness and, thus, there is not sufficient evidence to support this relationship. Consistent with Downing and Thackray, Clay (1979) also criticized the use of maturity as a readiness measure. Clay suggested that little is understood about the maturational process. She further stated that to wait for maturation to occur is detrimental to the child's growth in a society where reading is such an important skill. Moreover, Clay suggested that reading readiness is a period of time where the child brings knowledge from his/her past and combines this with new knowledge and thus goes through a transition process. According to Clay, this transformation occurs when the child sees the relationship between oral and written language.

In support of what Clay has suggested, Bullock (1975) stated that it is important the child understands that reading has a purpose before any attempt is made at reading instruction. Bullock further explains that studies since 1937 have shown that the appropriate mental age for reading readiness varies with instructional practices. If learning experiences meet the children's needs, then children of a mental age as young as four and a half years can learn to read. Consistent with this claim, Bullock noted that some children have learned to read at home prior to entering school.

Snow (1983) suggested that difficulties in the acquisition of reading skills may well be due to the fact that children are required to learn to read decontextualized material. She supported this view by suggesting that children are able to read several words prior to attending school. These words are not simple words but rather

signs and names of things or places which are important to the child. This understanding would then suggest that children do not need to reach a certain mental age in order to begin reading.

A relationship between intelligence and reading readiness is expected because reading requires comprehension of what the author is trying to communicate and that it requires decoding of print to verbal language. Because of this intuitively logical relationship, theorists have tried to determine an appropriate mental age for reading readiness; however, conflicting results have led to the conclusion that the appropriate age for beginning reading can only be determined by such factors as methodology in teaching reading, materials used, and setting variables (e.g., child-teacher ratio) (Downing & Thackray, 1972). Bullock (1975) supported this by suggesting that only extremely high intelligence is related to reading readiness. High scores may suggest to the teacher that he/she has underestimated the child's potential to learn; however, low scores do not necessarily suggest that the child's potential is limited. What often happens, as Bullock suggests, is that teachers' expectations of a child's achievement will change with the knowledge of the child's intelligence.

In contrast to the above views, Kaufman (1979) suggested that the correlation between reading and intelligence is very high, even though intelligence tests often do not require any reading. This would suggest that a child who shows a higher level of reading readiness will also have a higher I.Q. Over the decades, studies examining this relationship between intelligence and reading readiness have often relied on the Peabody Picture Vocabulary Test (PPVT) and Peabody Picture Vocabulary Test - Revised (PPVT-R) to provide a rough index of intelligence (e.g., Kaufman, 1979; Robertson & Eisenberg, 1981; Kontos, Mackley & Baltas, 1985). Although the PPVT and PPVT-R actually examine children's receptive vocabulary skills, the available literature has demonstrated a high correlation between PPVT scores and I.Q. scores

obtained from comprehensive intelligence tests such as the Stanford-Binet and the Wechsler Intelligence Scale for Children - Revised (WISC-R) (Robertson & Eisenberg, 1981). Hollinger & Sarvis (1984) suggested that although the PPVT-R is not a global measure of intelligence, it gives a rough estimate of the child's intelligence, specifically his/her receptive vocabulary.

Conflicting findings have been reported in the literature concerning the relationship between reading readiness and intelligence as measured by the PPVT-R. In a study by Bohannon, Warren-Leubecker and Hepler (1984), examining children between Kindergarten and Grade 3, they found that there was no correlation between the PPVT-R scores and reading achievement. However, they did note a relationship between reading achievement and word-order awareness. In another study, consistent with this finding, Saywitz and Wilkinson (1982, cited in Bohannon et al., 1984) found that language awareness and comprehension did not correlate with general intelligence. However, in the PPVT-R Technical Supplement (Robertson & Eisenberg, 1981), correlations between four school achievement tests and the PPVT-R were examined in terms of concurrent and predictive validity. Of special interest to the current study is the relationship between the PPVT-R and reading achievement. In general, their findings have shown that the PPVT-R gives an estimate of a child's verbal ability that is separate from reading ability and expressive vocabulary. The strongest relationship was between the PPVT-R scores and reading comprehension scores, and, although slightly weaker, a positive correlation was also noted with word knowledge and reading.

In addition to intelligence, the experiences a child "brings to school" also affect his or her progress in reading. This includes experiences (or lack thereof) with books, language opportunities, physical activity, and general health (Clay, 1982). In support of Clay's views, Stewart (1985) suggested that children need many experiences with reading in order to become successful readers. She stated that

through these experiences children will understand the relationship between speech and print. Additional support for this view is found in Snow, Nathan and Perlmann's study (1985): they found that children who are given the opportunity to interact with the reader and the reading material while being read to develop an understanding of story structure. They suggested that this understanding of story structure will aid in children's understanding of books they listen to as well as read. Based on her study of children's knowledge of the story schema, Young (1983) found it is important that children have experiences with books in order to learn and understand the story schema. This finding adds to the views of Snow and her colleagues (1985) who believed that experiences with books aid in the acquisition of reading. Presumably story knowledge will therefore aid in a child's readiness to begin reading. According to Downing and Thackray (1972), studies have shown that socio-economic status does not have a direct effect on children's ability; however, there often is a positive correlation. Children from low-income homes are usually lacking in one of the following areas: the amount they are read to, the number of books in the home, the extent to which written language is evident in the home, the frequency and type of conversations with family members, and parental attitudes towards education and reading in general. Although not causal, the lack of opportunities for the aforementioned types of interactions is related to socio-economic status as suggested by Downing and Thackray (1972). These activities are less likely to occur in low-income homes primarily due to the lack of availability of materials. Children from this type of home will therefore be less likely to have opportunities to read in the home.

Anderson and Stokes (1984) stated that the sources of literate experiences occur not only in books but also in many areas other than books. In opposition to Downing and Thackray's view, they suggested that lower class children will have experiences with print in many ways other than with books. Their study looked at preschool

children's experiences with literacy. They observed children in their own homes and observed their activities. They looked for experiences with literacy and defined it as "any action sequence involving one or more persons in which the production or comprehension of print plays a significant role" (p. 26). They found that literacy activities were not always restricted to interactions with books and therefore should not be limited to such a definition. In general, they found that low-income families engage in many types of literacy activities such as reading community and church activity calendars, recipes and grocery lists; however, if the view remains that literacy means activity with books, then, in general, low-income families are less often involved in literacy activities than middle-class families. They suggested that intervention ought to occur, for low-income families, through the social institutions of their daily lives, in previously stated activities such as entertainment and religious activities, which are their sources of print.

Much of what Hope Jensen Leichter (1984) found was similar to that of Anderson and Stokes' findings. She examined the family and ways in which a child can experience literacy. She found print to be in abundance in the homes she examined; print was not only very evident, but it also was generated in the homes through various daily activities. In addition, she found that attitudes toward literacy and its educational value are based on attitudes toward literacy in general, rather than the characteristics of what literacy entails. Supporting her claim, Leichter found many forms of literacy in daily activities in her observations within low socio-economic status homes. For example, these types of activities might involve such things as making grocery lists or reading church newsletters. Leichter maintained that these literacy activities in the homes were meaningful, not only because of the activities themselves, but also because they had specific importance for the family's welfare.

A lag in a child's language development would be expected to affect his/her



reading ability simply because he/she will be unable to see the relationship between words and their spellings. For example, if the words being studied are not in the child's oral vocabulary, then those words will be incomprehensible to him/her. For example, some children come to school speaking a dialect other than standard English. Such children then face the task of learning in standard English, which in essence contradicts the language they use at home and in the community (Downing & Thackray, 1972). These children therefore face the task of not only learning to read but learning to read in a language that is, in some aspects, foreign to them.

Holdaway (1979) suggested that the relationship between oral language and reading and writing is often ignored. Further, he argued that when children verbally tell a story, their level of story knowledge becomes evident. Therefore the structure of their language shows some evidence of the relationship between written and oral language. Children tend to use more of what Holdaway (1979) referred to as "written dialect" when telling a story. Written language often consists of words, phrases, tone and in general a language that is characteristic primarily of the written word. These story conventions are combinations of words which normally are not used in oral language. An example of this would be "said the boy". This becomes more evident as the child becomes more familiar with the written word. Holdaway (1979) also stated that children who are lacking in this ability will experience difficulty in learning to read. Because of the hypothesized relationship between linguistic development and reading skills acquisition, the complexity of children's stories may indeed be indicative of their early reading ability.

Another variable cited in the literature is the use of rehearsal strategies and its relationship to reading. Although little research has been conducted in the area of children's memory development, up to the age of 5 or 6, several studies have shown that memory strategies develop with age. An important, although unanswered, question is whether or not a relationship exists between memory development and

reading. As the following review will show, the views regarding rehearsal strategy are ambiguous. Consequently, some believe young children are unable to control their memory processes and are therefore unable to make use of a rehearsal strategy, yet others disagree. Furthermore, the relationship between reading and memory development is not fully understood.

Several theorists have suggested that young children are incapable of employing a verbal rehearsal strategy; this is thought to have a negative impact on their performance in both free recall and recognition. James Bebko (1979) tried to determine whether or not children employ a verbal rehearsal strategy between presentation of stimuli and later recall by observing such things as lip movements and verbalizations. He found that kindergarten children were unable to employ a rehearsal strategy, and suggested that this could possibly be due both to their limited ability to retain information in short-term memory and to their limited control over their thought processes. Bebko's findings are supported by the works of Ornstein and his colleagues (1978, 1985) who have found that young children engage in a more passive rehearsal strategy than older children. They found that young children tend to focus on individual stimulus words rather than repeat several words in attempting to remember, and suggested that this is because of young children's lack of understanding of their memory processes. Flavell (1970, cited in Ornstein & Naus, 1978) also reported similar results and suggested that young children lack the ability to aid their memory appropriately in certain tasks. In addition, Bransford (1979) has suggested that young children might not rehearse because they do not see the importance of such an activity. In a review of past literature on young children's memory, Ornstein (1978) noted that young children are unable to make use of strategies that permit them to remember material. The employment of rehearsal strategies increases with age. Naus, Ornstein and Hoving (1978) found evidence to suggest that the use of appropriate strategies develops over time, and is well

developed by the age of 12 or 13. According to Torgesen (1977b, cited in Rose, Cundick & Higbee, 1983), children with reading disabilities are deficient in their memorization strategies and this difference can be paralleled with the developmental differences seen in young and older children.

Flavell, Beach and Chinsky (1966, cited in Ornstein & Naus, 1978) found that spontaneous verbal rehearsal of to-be-remembered material increased with age. While very few kindergarten children rehearsed at all, spontaneous rehearsal was quite common in 12 year old children. Garrity (1975, cited in Ornstein & Naus, 1978) has reported similar results; he found that recall performance was related to children's spontaneous rehearsal and that some 4 and 5 year olds engage in some form of rehearsal strategy. Similarly, Belmont & Butterfield (1969, 1971, cited in Ornstein & Naus, 1978), reported that older children rehearsed more actively than younger children, as measured by subject-determined pauses between stimuli.

In an attempt to explain age differences, Kunzinger (1985) examined the memorial development of children at the ages of 7 and 9. He found that the effect of set size in relation to long-term recall and recall performance improved with age. Kunzinger maintained that these differences suggest a lag in memorial development and therefore can be predictive of cognitive ability.

In measuring children's use of rehearsal strategies, several studies examined the extent to which children were able to freely recall the stimulus information. Others examined the extent to which children could recognize the stimulus items if presented a second time. In addition, the amount subjects could recall the stimulus items was compared to their recognition. Ornstein and Naus (1978) found that although there were age differences in recall, there were no age differences noted in recognition performance. They suggested that the age difference could be explained by the rehearsal activity. After a 24 hour delay, both third grade and sixth grade students could recognize between 12 and 13 items on the 18-item list they had studied

the previous day. When instructed in the use of rehearsal strategy, children in the third grade could be brought to the level of the sixth graders; however, this change was only evident in the girls. In working with younger children, Myers and Perlmuter (1978) found that children between the ages of 4 and 5 could only recall an average of 3.4 items; however, in recognition of 18 items, their performance level was up to an average of 92% accuracy. According to Perlmuter and Lange (1978), children at the age of 10 can recall up to 10 items, which is also the approximate limit for adults. They also found that the developmental differences were not as great for recognition. Some of the findings reported may be influenced by the stimulus materials that have been used. Several studies have shown that on unfamiliar or abstract items, children have more difficulty than adults on tasks of recognition; however, when familiar items are presented, children as young as 5 years of age perform at a level comparable to that of adults (Mandler & Day, 1975; Nelson & Kosslyn, 1976; cited in Perlmuter & Lange, 1978). This relationship might be compared to the necessity for reading to be meaningful to the learner. If the material being read is not meaningful to the reader or not understood then the material to be learned becomes that much more difficult (Snow, 1983). In studies examining picture memory, both Shepard (1967, cited in Bransford, 1979) and Standing (1973, cited in Bransford, 1979) found subjects were able to achieve between 90% and 98% accuracy on recognition tests that included up to 10,000 pictures. Bransford (1979) suggested this level of accuracy can only be achieved when the stimulus is meaningful to the subject.

In attempting to answer the question of why this difference between recall and recognition performance exists, several researchers have offered an explanation. Piaget (1968, cited in Perlmuter & Lange, 1978) has suggested that recognition ability develops in the first few months of life and free recall ability does not develop before a child reaches the age of 1 year. Because of this developmental difference in the

presence of free recall versus recognition, it may suggest that different strategies are used and a performance difference will therefore be noted. Piaget and Inhelder (1973, cited in Perlmutter & Lange, 1978) suggested that different means are utilized in recall and recognition. They stated that images that are internalized (consciously or subconsciously learned), are used in recall whereas visual "schemata" are used in recognition. Bransford (1979) and Ackerman (1987) have suggested that the different effects obtained in recall versus recognition are because free recall requires the subject to rely on his/her own cues in order to retrieve the information. The generation of the subject's own cues is presumed to be more difficult than when the cues are presented to him/her.

In addition to examining the differences between free recall and recognition, various studies have examined the length of time needed or used in order for children to remember the stimulus items. In studying letters and/or words, kindergarten children require longer to process the information than do more skilled readers (Gibson & Levin, 1975; Nodine & Evans, 1969; cited in Hoving, Spencer, Robb & Schulte, 1978). Ornstein and Naus (1978) hypothesized that slower presentation of to-be-rehearsed stimuli might lead to an improvement in recall. Although not conclusive, some studies support Ornstein and Naus' hypothesis. For example, Johnson (1980) reports some studies that indicate a longer rehearsal period is associated with improved performance. Ornstein, Medlin, Stone and Naus (1985) found that second grade children's recall improved with additional study time. However, Johnson also found several studies contradicted this finding and suggested there are no differences in performance related to length of rehearsal period. Jackson and Schneider (1985) found that when subjects were given additional study time they more actively rehearsed; however, this did not improve recall performance. Contrary to this observation, Ornstein, Naus & Liberty (1975, cited in Ornstein & Naus, 1978) found that recall performance as related to study time also

increased with age. When study time was lengthened in order to examine whether young children in grade three would employ a more active rehearsal strategy, they found that recall performance improved; however, this improvement was only noted in the girls. However, Brown and Smiley (1978, cited in Brown, Bransford, Ferrara & Campione, 1983) found that children between grades five and seven did not appear to make strategic use of additional study time.

While several studies appear to focus on the evidence of rehearsal strategies, past research has also examined the effects of rehearsal prevention. Johnson (1980) has suggested that this may be done either during presentation of the stimulus or in the interval immediately following. Both Reitman (1971, cited in Klatzky, 1975) and Shiffrin (1973, cited in Klatzky, 1975) found when the retention interval required the subject to perform arithmetic or syllabification tasks, recall performance decayed. Klatzky (1975) concluded that interference occurred to a greater degree when the retention interval involved verbal tasks rather than non-verbal. In comparing studies conducted by Shepard and Teghtsoonian (1961, cited in Klatzky, 1975) and Waugh and Norman (1965, cited in Klatzky, 1975) Klatzky noted that rehearsal interference affected recall performance to a greater degree than recognition performance. Based on the findings of Shepard (1967, cited in Klatzky, 1975), it seems likely that interference of rehearsal will not affect recognition performance. Shepard found that although recognition memory decayed, this occurred only at a very slow rate. Even 120 days after the stimuli were first presented, subjects were still able to recognize more than 50% of the stimuli.

Inconsistencies in the literature suggest that it is uncertain whether memory development is related to reading; however, some research suggests a relationship may exist. For example, in examining the relationship between reading ability and memory access, Jackson (1980) found that skilled readers were more proficient in responding accurately than less skilled readers when the task required speed in

access of memory; however, this difference was not evident when the task was unfamiliar in nature. Furthermore, Jackson hypothesized that before children learn to read they may have developed an ability to access their memory, and this ability is superior in those children who later become more skilled readers. This suggests that memory ability may be a predictor of reading ability. Jackson also speculated that more skilled readers have developed more effective memory access in general through practice in reading.

Juola, Schadler, Chabot and McCaughey (1978) found that as reading ability increases, so does visual search strategy in tasks requiring the subject to indicate if a stimulus letter was present in a given group of letters. Their findings suggest that as reading ability increases so does the ability to search and encode visual information, the process involved in recall and recognition tasks (Anderson & Bower, 1974, cited in Klatzky, 1975). Juola and his colleagues maintained that the skills involved in searching and encoding visual information is related to reading. Therefore the child who is able to process visual information to a higher degree might be more skilled in reading or ready to begin reading earlier.

It has been suggested that if children are able to engage in a verbal rehearsal strategy or are instructed to do so, their reading comprehension level will increase. A study by Rose, Cundick and Higbee (1983) examined children with specific learning disabilities. They found when learning disabled children were instructed to use a verbal rehearsal strategy in reading comprehension, their performance was better than those children who were instructed to use a visual imagery strategy; children who received instructions in either strategies were better than that of those who were not instructed in any strategy at all. This finding would thus suggest that the employment of a rehearsal strategy improves reading comprehension. Paris (1978) suggested that a child who engages in such activities as rehearsal is able to attend to specific tasks in terms of the intended goal. Moreover, he suggested that the child

who is able to control such processes will be able to transfer such behaviour in learning to read. Thus, although the literature is equivocal, a relationship between the ability to access memory and reading seems likely. However, it remains to be seen whether this relationship will be evident at the beginning stages of reading.

### Summary:

Children come to school with their own variety of experiences. Some children come with a lag in their speech, others experience difficulty in visual discrimination and/or perception, still others experience auditory discrimination difficulties. All of these contribute to difficulties in learning to read simply because of the nature of the reading process. Abilities that are necessary in beginning reading include a good command of the English language, the ability to take advantage of the relationship between oral and written language, and the ability to learn the directional limitations and patterns of the reading process (Clay, 1982).

Reading involves such things as taking risks, predicting, questioning, and generalizing which Hittleman (1978) stated are the same kinds of things involved in learning language. Because of this relationship, and the fact that reading is language, the reading readiness program must place its emphasis on language development. This view is supported by Downing and Thackray (1972) who suggested that the language experience approach best serves the needs of children with different dialects. By using this approach, children will be reading materials that they can relate to and therefore understand, which is not always the case with basal readers. One important implication then is that teachers ought to look at what method and materials of instruction would best meet the child's needs, given his or her limitations (Durkin, 1976). Consistent with this is Howarth's (1984) suggestion that programmes that centre on oral language are the best type of programme.



Bullock (1975) maintained that the introduction of books prior to the school years also promotes reading readiness. He further suggested that this experience with books allows the child to gain enjoyment and an understanding of how print unfolds to reveal a story. In support of this view, Clay (1979) also suggested that providing a home environment where reading comes naturally and where the child is given ample opportunity to explore language is important for the child's readiness to learn. However, caution should be exercised so that parents do not become overly anxious to teach their child to read. It is important that the child experiences success and understands the values and importance of learning to read. Again, a child must have positive experiences with literature and discover that it is important, purposeful, and enjoyable. These experiences will also foster interaction with the language of books and in turn develop oral language and possibly provide an understanding of written language (Robinson, Strikland, & Cullinan, 1977; Stanchfield, 1973). This development will occur when the relationship between all facets of communication become clear. This relationship becomes clear when children realize that when reading or writing a story it is much like listening or speaking.

## CHAPTER TWO

### PURPOSE AND RATIONALE

The foregoing review represents an attempt to look at how the concept of reading readiness has developed over time and to identify some of the factors that affect this stage in a child's development. What appears to be consistent in the literature is the importance of the child's environment. Although not all of the authors cited in this paper discussed the same points, all agreed that success in beginning reading and a purpose for reading were deemed the most important. What appeared to be the most inconsistent was the emphasis on underlying factors affecting a child's readiness to read. For example, although some agreed that mental age was of importance, others felt it was an irrelevant factor in determining readiness. Furthermore, knowledge about the learning potential of young children is very limited and therefore not well understood (Brown et al., 1983).

An important factor in teaching beginning reading is to provide children with an environment that allows for success and, most importantly, gives them a purpose for reading. Parents are often anxious about their children learning to read and will often force their child to practice reading. This can have both good effects and bad. As Bullock (1975) and Clay (1979) both suggested, caution should be exercised in order for this to be a positive experience for the child. By providing an environment that is print-rich, in both the classroom and at home prior to school, a child will see that reading is important and is purposeful--not only for enjoyment, but also in the daily activities of home and school life. The child will then have an interest in reading that is fostered by his or her environment.

The literature reviewed gives evidence of how equivocal past research has been

in the study of children at the stage of beginning reading. No two studies agreed entirely on the nature of the young child nor did they agree as to what variables are important. Some researchers agree on some aspects yet disagree on others. What is still not fully understood is what skills or abilities are associated with a high level of reading readiness. Ultimately, the question that needs to be answered is what skills and/or abilities are necessary to reach this level of reading readiness.

In an attempt to answer some of the above questions, this study investigated the relationship between kindergarten children's early reading ability, their verbal ability, story knowledge and memory development. As reading and oral language are both facets of communication, a positive relationship was expected.

In addressing the question of reading readiness, Clay (1979b) has suggested that the following types of questions, as described in the tests she has developed, give a general overview of a child's readiness to begin reading. The *SAND test* (Clay, 1972, cited in Clay, 1979b) asks children various questions about story knowledge. This includes such things as letter, word and book orientation, as well as sequencing of words and lines. In addition to this, Clay also describes a test used in early identification in which children are required to read words that are most often used in beginning reading.

The literature reviewed suggest conflicting views regarding the relationship between children's intelligence and their reading level. As stated above, some researchers have suggested that there is little evidence that a relationship exists between reading readiness and intelligence (Downing & Thackray, 1972; Clay, 1982). Others have suggested that mental age is inappropriate in determining a child's readiness for beginning reading since children with a mental age as young as 4.5 are able to read (Bullock, 1975; Snow, 1983). Still others have found a relationship between intelligence and reading readiness, yet this relationship does not include all areas of reading (Bohannon et al., 1984; Robertson & Eisenberg, 1981). The PPVT-R

Technical supplement shows, following extensive research, that a relationship exists between reading and intelligence as measured by the PPVT-R. It was therefore hypothesized that there would be a positive correlation between reading readiness and intelligence. In support of the hypothesis that reading is related to intelligence, Smith (1973, cited in Howarth, 1984) stated that language and thought must interact when the child is reading. Presumably, this would suggest that if a child is deficient in either oral language or intelligence, then his/her ability to begin reading will be delayed. Because of the inconsistent nature of the literature, it was decided to determine if intelligence was indeed related to reading readiness.

Many researchers have stressed the need to acknowledge the relationship between oral language and reading (Bullock, 1975; Clay, 1982; Holdaway, 1979; Sippola, 1985; Snow, 1983; Stewart, 1985). This is consistent with the hypothesis that a relationship ought to exist in the level of ability of both oral language and reading readiness. In keeping with Bullock's (1975) view that children are ready to learn to read when they reach a given level of oral language ability, it was hypothesized that children with more developed verbal fluency will be at a higher level of reading readiness. In order to examine this relationship, children's oral language was measured. Sachs and Devin (1975) examined the linguistic structure in children's speech in order to determine the level of children's oral language. In measuring children's oral language, children's verbal stories were recorded and analysed in terms of the mean-length-of-utterance (MLU). Mean-length-of-utterance (MLU) refers to the mean number of morphemes in speech, that is, the smallest meaningful linguistic unit (Paivio & Begg, 1981). According to Brown (1973), MLU "... is an excellent simple index of grammatical development ..." (p. 53). Consistent with this belief, Dale (1972) stated that, "although MLU appears to be a very crude measure, it may well be that best single indicator of language development ..." (p. 274). It was therefore decided to examine children's oral language development or verbal fluency

on the basis of their MLU.

Children's understanding of story structure is thought to be related to knowledge and experience that a child has both prior to and while learning to read (Bullock, 1975; Clay, 1982; Snow et al., 1985; Stewart, 1985). Thus, in addition to examining children's verbal fluency, their knowledge of story structure was also examined. Because a relationship between reading readiness and story knowledge is an open question, it was therefore hypothesized that children with a higher level of reading readiness will also show better development in their knowledge of story structure.

Finally, several theorists have suggested that young children are incapable of employing a conscious rehearsal strategy, yet older children are capable of this (Bebko, 1979; Ornstein, 1979; Ornstein et al., 1985). The studies cited in the literature suggest that there may be a relationship between the presence of a rehearsal strategy and reading ability. This is seen primarily when comparing learning disabled children to normal children. Because such things as reading comprehension improve as a result of rehearsal strategy instruction, then it would seem possible that a relationship may exist between reading readiness level and memory development (Ornstein & Naus, 1978; Rose et al., 1983). Related to rehearsal strategy is the use of study time. Some researchers have suggested that as study time increases then so will performance; however, the results of these studies are not conclusive (Johnson, 1980). The literature reviewed is of such an equivocal nature that the relationship between length of study time and accuracy in recall and recognition of stimuli and reading readiness is not fully understood. Therefore the possibility of a relationship ought to be examined.

The *Test of Early Reading Ability (TERA)* was used as a comprehensive measure of reading readiness level. The TERA requires children to answer questions similar in nature to those on the SAND test as well as questions comparable to those Clay

(1979b) refers to as word tests. The TERA provides a level of reading readiness in terms of the child's level of book knowledge and orientation, story knowledge, letter knowledge and reading ability. The TERA was therefore chosen for use in this study as a general measure of reading readiness level. As an additional measure of reading readiness, the classroom teacher was asked to rate each child's reading readiness level on a scale of 1 to 7. This measure should be more related to the specific types of learning activities used in the classroom of the children who participated, and may therefore be a relevant indicator of readiness level.

The *Peabody Picture Vocabulary Test-Revised* was chosen as it provides a rough estimate of children's intelligence. While this test is not comprehensive, it provides a general level of intelligence (Hollinger & Sarvis, 1984). Dale (1972) has suggested that PPVT scores correlate highly with Stanford-Binet I.Q. scores and therefore is used as a general intelligence test. Further supporting this finding, Sattler (1974) concluded through his studies that the PPVT generally provides a stable I.Q. estimate. Thus, the PPVT-R and the Test of Early Reading Ability (TERA) were used in order to determine the relationship between reading readiness and intelligence.

In order to measure children's language development, stories that children told were recorded and analysed for MLU, clauses and core statements. As Brown (1973) and Dale (1972) have stated, MLU is a good measure of children's language development. As an additional measure of language development, the occurrence of subordinate and coordinate clauses in the children's speech, was also recorded (cf. Hutchison, 1977). The stories *Frog on His Own* (Mayer, 1973) and *Frog Where Are You?* (Mayer, 1969) were used. Young's (1983) modification of materials and her procedure were used. This previous work thus enabled the analysis of MLU and story structure for the study proper.

The memory test was designed in order to evaluate three main factors. Studies have indicated that recognition is better than free recall (Myers & Perlmuter, 1978).

In addition, others have found when rehearsing, either during the study period or after the stimulus is removed, interruption has an effect on later recall, but not recognition (Shepard & Teghtsoonian, 1961; Waugh & Norman, 1965, cited in Klatzky, 1975). Finally, study time appears to affect the amount recalled and recognized (Ornstein, Naus & Liberty, 1975, cited in Ornstein & Naus, 1978). On this basis, the test was designed to examine accuracy in free recall, accuracy in recognition and the study time in which children were engaged in learning stimulus sets. The effect of uninterrupted intervals between presentation of stimulus and free recall versus interrupted intervals between presentation of stimulus and free recall were also examined. Furthermore, the effects interruption has on recognition memory was also examined.

Given that the aim of the present study was to investigate the relationship between reading readiness and certain cognitive variables, a population of pre-readers had to be identified. Children in kindergarten are usually at the pre-reading stage and thus were likely to be appropriate for this study.

In summary, the present study was designed to address following questions:

- (1) Is intelligence associated with reading readiness?
- (2) Is language development or verbal fluency (i.e., MLU) associated with reading readiness?
- (3) Is story knowledge associated with reading readiness?
- (4) Is length of study time and accuracy in recall and recognition of stimuli associated with reading readiness?

## CHAPTER THREE

### METHOD

#### Subjects:

The kindergarten children from a parent-funded parochial school in St. Catharines, Ontario participated in this study. There were 12 boys and 12 girls between the ages of 5 years 6 months and 6 years 6 months, with a mean age of 5 years 10.75 months ( $S.D.=3.19$ ). The children were native English-speakers, however, two of the girls were from bilingual homes. In one home, both Laotian and English were spoken, while Dutch and English were spoken in the second case.

This school was selected based on a number of criteria. The families of these children were heterogeneous in terms of socio-economic status and home geographic location. The families involved with this school are from a cross-section of the community's socio-economic status ranging from slightly above the poverty line to the very wealthy, with the majority being middle class. Although the school is located in St. Catharines, Ontario, children are bussed in from other communities as far as Niagara Falls, Thorold and Beamsville. The majority of the children were from urban settings; however, some, primarily fruit farmers' children, were from rural settings. The children were all similar, however, in their families' commitment to education as the school is entirely parent funded and controlled.

Kindergarten children were chosen for this study because most children in kindergarten are at the pre-reading stage. All of the kindergarten children at the school were asked to participate in the study (see Appendix A for information on consent procedures). When a child's parents had consented to have him/her participate in the study, then each child was asked to participate.



### Procedure

Prior to beginning testing, the researcher spent time in the classroom so that the children were familiar with her. Each child was asked to complete four tests. The testing for each child was spread over four sessions on separate days so that fatigue was minimized. Both the school library and a partitioned-off section of the kindergarten classroom were used as testing rooms. These places were familiar to the children yet conducive to the test situation in terms of the absence of other children and distracting noise. While the kindergarten classroom was being used, the other children were absent from the classroom. The tests were administered in the same order to each child. The *Peabody Picture Vocabulary Test-Revised* was presented initially, followed by the *Test of Early Reading Ability*, then the story telling task, and finally the rehearsal or memory development test.

The *Peabody Picture Vocabulary Test-Revised (PPVT-R)*, Form M (Dunn & Dunn, 1981), was administered in order to obtain a rough index of verbal intelligence. The PPVT-R requires the child to listen to a given word and to choose from four alternatives the picture that best describes the word. Each child was then asked to complete the *Test of Early Reading Ability (TERA)*. The TERA was administered in order to determine each child's reading readiness level. The TERA requires the child to respond verbally to pictures, letters or words. It examines the child's level of book knowledge and orientation, story knowledge, letter knowledge and reading ability. As an additional measure of reading readiness, the classroom teacher was asked to rate each child's reading readiness level on a scale of 1 to 7. A score of 1 indicated a low readiness level and a score of 7 indicated a high readiness level.

The third test required each child to describe two picture stories. The stories, based on Mercer Mayer's books, *Frog Where Are You?* (1969) and *Frog On His Own* (1973), were those modified by Young (1983). Rather than telling the story to the experimenter, each child was asked to tell the two stories to a "Cabbage Patch" doll of

the same sex. This procedure was adopted because the child might feel that the researcher already knew the story and therefore omit descriptive details. Sachs and Devin (1976) have shown that children speak to adults differently than to babies or baby dolls. Their speech, although more simple, contains more detailing when speaking to babies or baby dolls. Presumably, the children make the assumption that the adults listening to a story have some prior knowledge of the story, whereas they assume that babies require more detailing in order to understand the story. Sachs and Devin found that children did not differ in their interactions between babies and baby dolls; consequently, "Cabbage Patch" dolls rather than younger children were used as listeners in this study for reasons of convenience.

Each child was shown the twelve pictures of each story in the correct order so that they could become somewhat familiar with the sequence of the story prior to telling their story. The pictures were then removed and individually shown to the child. When the child had finished telling about a picture, he/she turned over the picture he/she had been telling about to indicate that he/she was ready to speak about the next picture. Both stories were audio-taped. At all times the tape recorder remained hidden from view of the child in order to eliminate the possibility of undue stress. The stories were later transcribed and scored using Hutchison's (1977) transcription and scoring procedures: the number of morphemes, the number of utterances, MLU and the number of relative clauses, coordinate clauses and subordinate clauses. In addition, story knowledge was analysed in terms of the number of core statements and narrative conventions as described in the coding manual developed by Young (1983). Core statements are those statements that were determined as central to the gist of the story. Narrative conventions include such phrases as, "Once upon a time".

In the fourth testing session, the children completed the memory test. Stimuli were developed to measure memory development because no standardized tests have

yet been developed to measure either of these variables on their own. Pictures were chosen from a grade one workbook. All were similar in size and pasted on cards of the same size. The pictures were all familiar objects to children of kindergarten age. For example, pictures of a dog, tree and snowman were used (for a complete list of the stimulus sets used see Appendix B). The distractor pictures were different for each set but were all similar in size and familiarity to the students. In order to avoid the possibility of "learning" the distractor items, at no time were the same two pictures used.

Each child was told that he/she would be shown a set of pictures to study. A trial test using a set of three pictures was presented to demonstrate the procedure to the child and to ensure that the child understood what was required of him/her. The study time needed in order to remember the pictures was determined by the child. When the child indicated that he/she was ready, the pictures were removed and the study time was recorded. After an uninterrupted interval of one minute, when the researcher remained silent so as not to distract the child, the child was asked to verbally recall the pictures presented. The names of the pictures were recorded. Then, the recognition test was administered: the child was presented with the set of previously presented pictures as well as ten distractor items. The child was then asked to select the set of previously presented pictures. The pictures that the child selected was recorded. This procedure was repeated so that two trials each for stimulus sets of three, four and five pictures were given.

The second part of the rehearsal test was similar in procedure; however, in the second situation, the one minute interval between study time and free recall was interrupted. Bebek's (1979) procedure was adopted: during this one-minute interval, the child was required to do verbal activities, such as count as high as they could, up to 100, say the alphabet and converse with the researcher. This procedure was adopted to prevent any rehearsal. Presumably, the interrupted interval will prevent

verbal rehearsal and therefore will limit the amount the child is able to recall.

## CHAPTER FOUR

### RESULTS

Pearson-product moment correlations were calculated to determine the relationship between reading readiness, as indexed by the TERA and teacher ratings, and the measures of mental ability (PPVT-R), verbal fluency (MLU) and story knowledge (core statements). The memory data were not only correlated with the reading readiness measures, but they were also subjected to additional analyses. Consequently, the results for the memory data will be presented in a separate section. First, the relationships between the TERA and the teacher ratings and mental ability, verbal fluency and story knowledge will be described, and then the memory data. A  $p < .05$  significance level is used throughout.

#### Reading Readiness, Mental Ability, Verbal Fluency and Story Knowledge

Table 1 presents the means and standard deviations for the TERA, the teacher ratings, the PPVT-R, MLU and core statements. The mean TERA standard score of 100.21 (S.D. = 12.10) suggests that this group of kindergarten children was average in terms of reading readiness skills. The norms for the TERA standard score equivalents are normally distributed with a mean of 100 (S.D. = 15) and are adjusted for age. While the mean teacher rating of 4.67 (S.D. = 1.56) is slightly above the mid-point on the 7-point rating scale it is uncertain whether in rating the children's readiness level, the teacher took age into account. As a result of this discrepancy, the TERA scores and the teacher ratings were correlated in order to determine the reliability in the use of such a measure. A significant correlation was not found which might suggest that the teacher emphasized different aspects of readiness than the TERA, or possibly

**TABLE 1**

**Means and Standard Deviations for Reading Readiness Measures, PPVT-R, MLU  
Sum of Clauses, and Core Statements.**

<b>VARIABLE</b>	<b>MEAN</b>	<b>STANDARD DEVIATION</b>
TERA	100.21	12.11
Teacher Ratings	4.67	1.56
PPVT-R	110.46	14.19
MLU	7.16	1.05
Sum of Clauses	4.12	4.86
Core Statements	27.00	11.06

rated the children on the basis of age.

The children's mean standard score of 110.46 (SD = 14.19) on the PPVT-R, Form M, a measure of receptive vocabulary that is frequently used as a rough index of ability, suggests that this particular group of kindergarten children has slightly above mid-average ability.

Table 2 presents the Pearson-product moment correlations between the TERA and teacher ratings and age, PPVT-R scores, MLU, the sum of clauses and the number of core statements. A significant correlation was found between the teacher's rating and age, but not with the TERA scores. The children's ability level as indexed by the PPVT-R is significantly related to both the TERA scores and the teacher's ratings of the children's readiness level.

The children's verbal ability as determined by their MLU is significantly related to the TERA scores; however, the relationship with the teacher's ratings is not significant. The sum of relative, subordinate and coordinate clauses the children included in their stories was significantly correlated with the teacher's ratings, but not with the TERA scores.

Norm-referenced standard scores do not exist for MLU, the occurrence of relative, subordinate and coordinate clauses and the number of core statements children make when telling stories. However, the available literature on MLU suggests these kindergarten children, most of whom were 5 years of age, have well developed language abilities as the mean MLU is 7.16 (S.D. = 1.05). For example, Sachs and Devin (1975) found that Naomi, aged 5-5 years, had an MLU of only 3.35 when speaking to a doll. Because of this difference in MLU it is difficult to determine how representative these data are of other children. A larger sample is necessary in order to determine the generalizability of these descriptive data.

In measuring the children's story knowledge, the number of core statements the children included in their stories was correlated with the TERA and teacher

TABLE 2

Pearson-Product Moment Correlations between TERA scores and Teacher Ratings and other variables.

VARIABLE	TERA	Teacher Ratings
	r	r
Age	-.34	.45*
PFVT-R	.40*	.41*
MLU	.46*	.34
Sum of Clauses	.36	.48*
Core Statements	.41*	.44*

\*p < .05.



ratings. The number of core statements the children used relates significantly to both the TERA and teacher ratings.

#### Reading Readiness and Study Time, Recall and Recognition

The memory test provided data on the time the children spent studying the pictures, the number of pictures they recalled and the number of pictures they recognized. In addition, the data permit an examination of the effect that interruption in the one-minute interval between studying and free recall has on performance on the recall and recognition tests. Initially, the children's study time data will be considered. Then the recall and recognition data will be presented. Finally, the correlations between the memory measures and reading readiness will be discussed.

Study Time. The study time data, shown in Table 3, were analysed by a 3 x 2 within-subjects analysis of variance with set size (i.e., 3, 4 or 5 pictures) and interval condition (i.e., uninterrupted or interrupted before testing) as the factors. Set size was the only reliable effect,  $F(2, 46) = 468.15, p < .05$ . As Figure 1 illustrates, the children increased their study time as the sets increased in size.

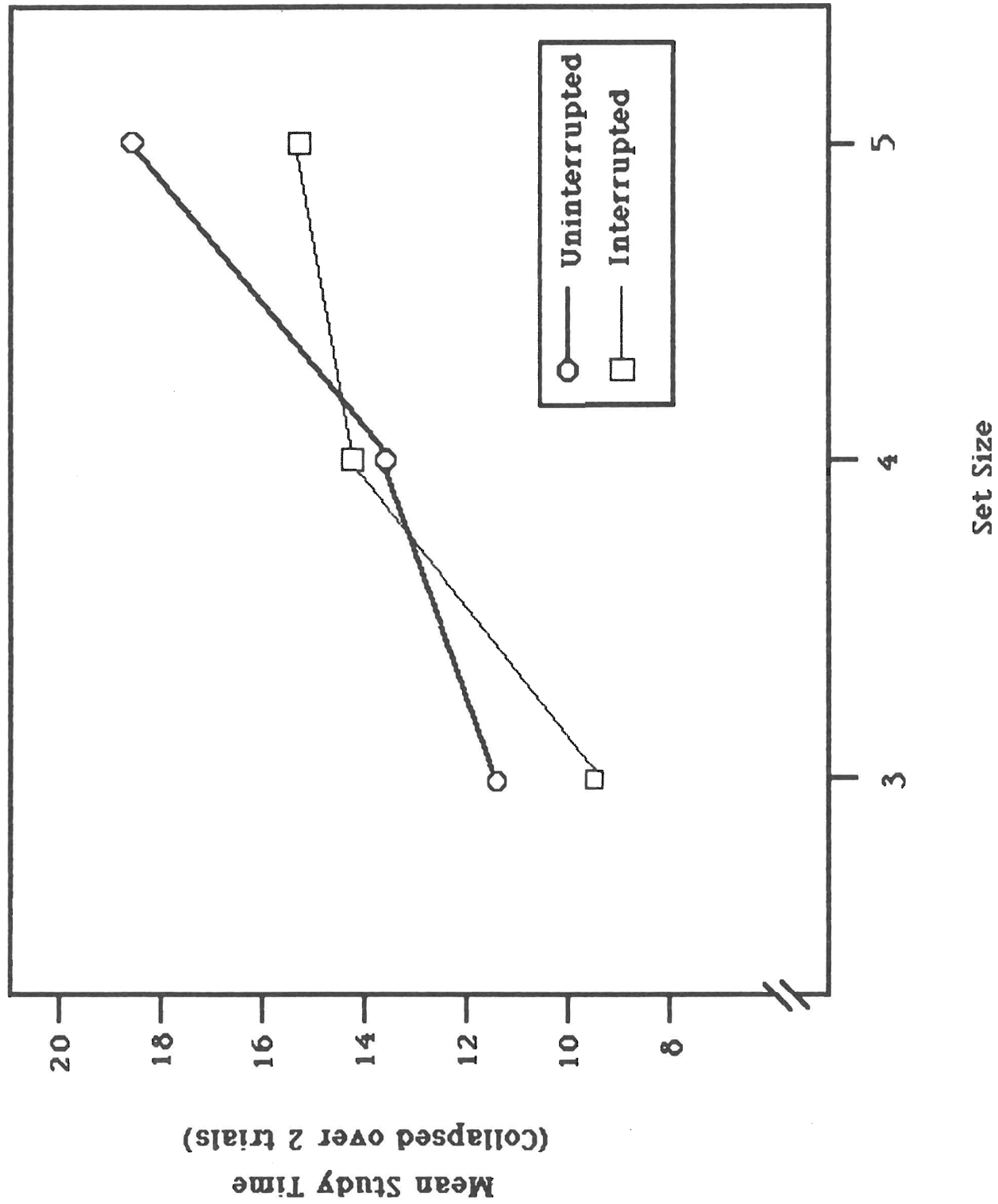
Recall. After studying the pictures for as long as they wished and waiting for an interval of one-minute, the children were asked to recall the names of the pictures they had studied (cf. Table 4). Their performance on this free recall test was evaluated by a 3 x 2 within-subjects analysis of variance. Set size (i.e., 3, 4 or 5 target pictures) and interval condition (i.e., uninterrupted or interrupted) were the factors. As Figure 2 shows, interruption in the interval between studying the stimuli and the recall test had a negative effect on performance,  $F(1, 23) = 56.41, p < .05$ . Set size did not affect performance,  $F(2, 46) = .674, p > .05$ , and the interaction between set size and

**TABLE 3****Means and Standard Deviations for Study Time**

CONDITION	SET SIZE	MEAN	STANDARD DEVIATION
Uninterrupted	3	11.38	6.38
	4	13.71	7.11
	5	18.25	18.02
Interrupted	3	9.69	9.50
	4	14.08	12.22
	5	15.29	18.00

Figure Caption

Figure 1. Mean study time of uninterrupted and interrupted intervals as a function of set size.

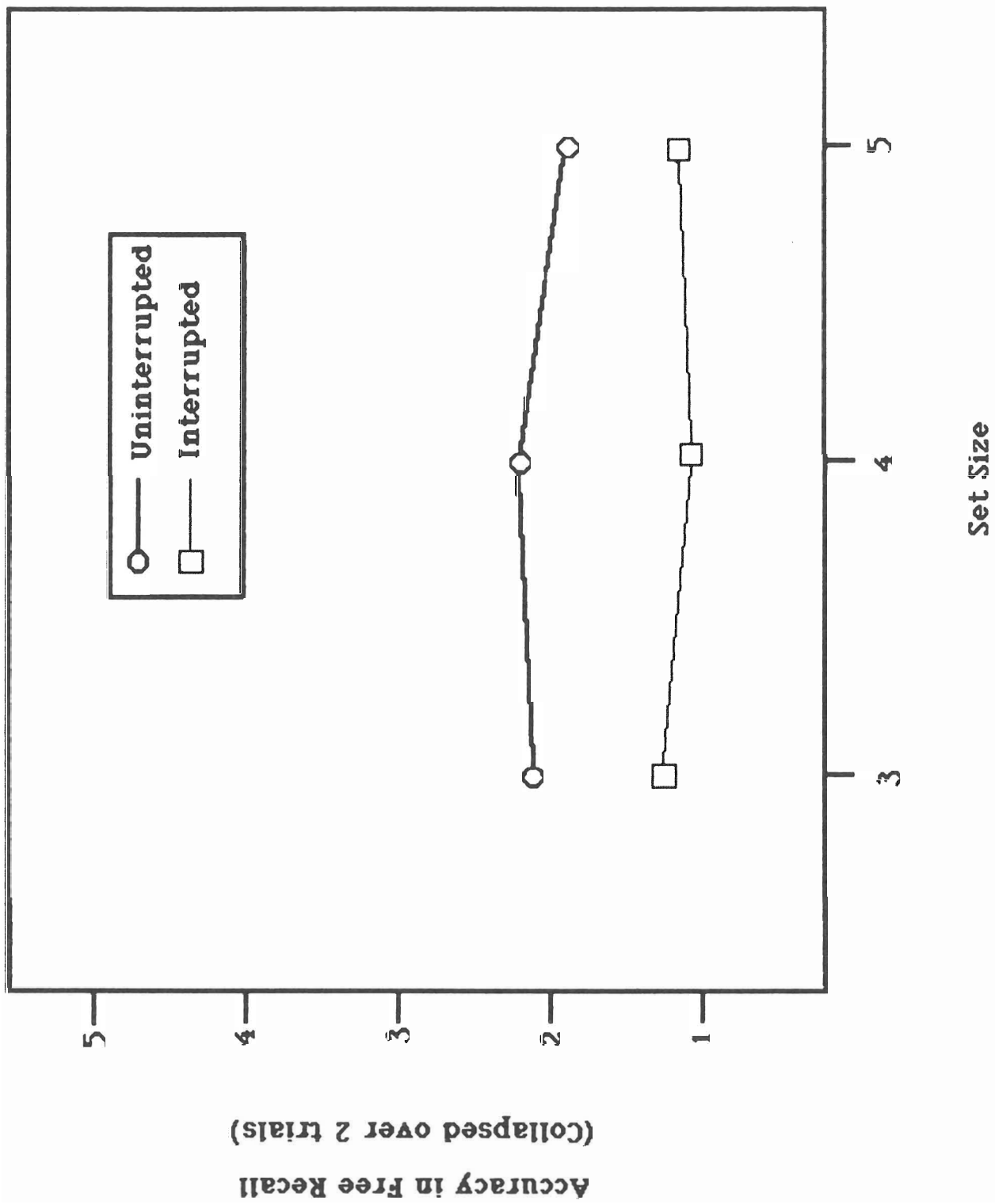


**TABLE 4****Means and Standard Deviations for Recall**

CONDITION	SET SIZE	MEAN	STANDARD DEVIATION
Uninterrupted	3	2.10	.64
	4	2.19	.89
	5	1.85	1.85
Interrupted	3	1.23	.91
	4	1.04	1.08
	5	1.13	1.17

Figure Caption

Figure 2. Mean accuracy in free recall of uninterrupted and interrupted intervals as a function of set size.



interval condition also was not significant,  $F(2,46) = 1.42, p > .05$ .

Recognition. The children completed a recognition test after they completed the free recall task. They were presented with sets of pictures that included the target items they had studied on each trial as well as ten distractors and were asked to select the items they had studied. As Table 5 shows, the children were quite successful on the recognition task and performed at a level that was close to ceiling. Set size had an effect on recognition,  $F(2,46) = 120.87, p < .05$ , which is illustrated in Figure 3. Although interruption did not affect performance,  $F(1,46) = .01, p > .05$ , the interaction between interval condition and set size was reliable,  $F(2,46) = 3.81, p < .05$ . Figure 3 and Table 5 show that the nature of the pre-test interval did not affect recognition when only three items were studied. Performance on the larger sets of pictures, however, appears to be affected by interruption during the interval after studying, although this effect is small relative to that of set size.

#### Relationship Between Reading Readiness and Study Time, Recall and Recognition.

Pearson-product moment correlations were calculated to determine the relationship between reading readiness and study time, recall and recognition. As Table 6 shows, a significant correlation between reading readiness as measured by the teacher's ratings and study time was found only when a set of five items was studied. This correlation was noted for both the uninterrupted and interrupted test conditions.

Tables 7 and 8 show that neither the TERA nor the teacher ratings significantly correlate with either the free recall or recognition tasks. This lack of significance is noted over the six set conditions in both the uninterrupted and interrupted conditions of the memory test.



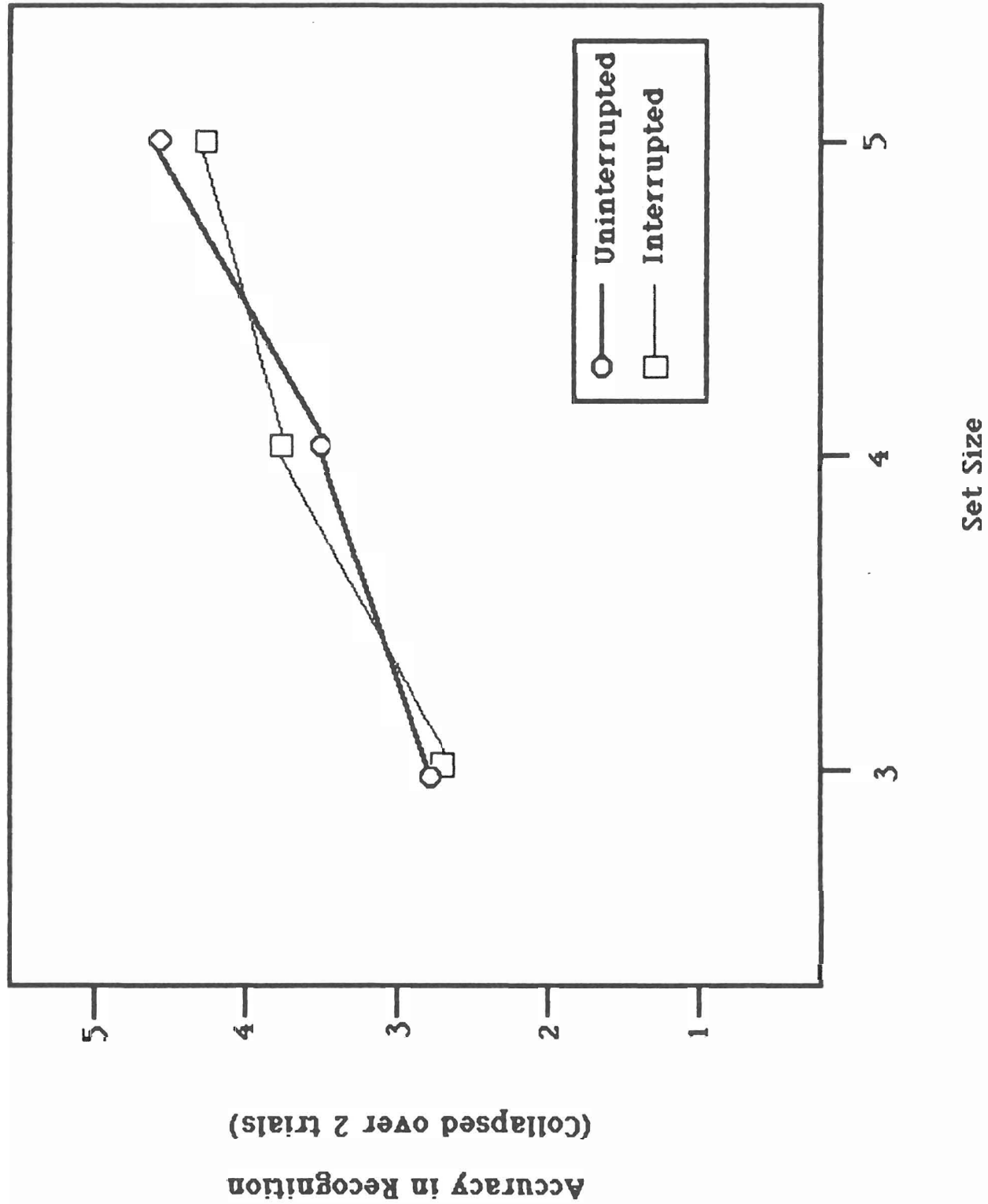
TABLE 5

Means and Standard Deviations for Recognition

CONDITION	SET SIZE	MEAN	STANDARD DEVIATION
Uninterrupted	3	2.77	.42
	4	3.52	.54
	5	4.54	.59
Interrupted	3	2.73	.39
	4	3.73	.74
	5	4.21	1.17

## Figure Caption

Figure 3. Mean accuracy in recognition of uninterrupted and interrupted intervals as a function of set size.



**TABLE 6**

**Pearson-Product Moment Correlations between TERA scores  
and Teacher Ratings and Study Time**

CONDITION	SET SIZE	TERA	Teacher Ratings
		r	r
Uninterrupted	3	-.32	-.34
	4	-.39	-.07
	5	-.06	.42*
Interrupted	3	-.05	.36
	4	-.04	.39
	5	-.11	.41*

\*p < .05.

**TABLE 7**

**Pearson-Product Moment Correlations between TERA scores  
and Teacher Ratings and Free Recall**

CONDITION	SET SIZE	TERA	Teacher Ratings
		r	r
Uninterrupted	3	-.32	-.04
	4	-.19	.09
	5	.06	.20
Interrupted	3	-.36	.32
	4	-.28	.10
	5	-.14	.18

\*p < .05.

TABLE 8

Pearson-Product Moment Correlations between TERA scores  
and Teacher Ratings and Recognition

CONDITION	SET SIZE	TERA	Teacher Ratings
		r	r
Uninterrupted	3	-.32	-.06
	4	-.31	.11
	5	.16	.22
Interrupted	3	-.21	.10
	4	-.21	-.01
	5	-.20	.02

\*p < .05.

## CHAPTER FIVE

### DISCUSSION

The purpose of this study was to determine the relationship between children's reading readiness and their intelligence, verbal fluency, story knowledge and various aspects of memory. Much of the available literature suggested that a relationship should exist between reading readiness and each of these factors; however, it seemed appropriate to examine the nature of this relationship because the literature is ambiguous and inconclusive.

The results of this study indicate that a relationship exists between reading readiness (as indexed by the TERA and teacher's ratings) and intelligence (as indexed by the PPVT-R), verbal fluency (measured by MLU and the sum of the occurrence of clauses), and story knowledge (the number of core statements). However, it is important to note that MLU was significantly correlated with only the TERA scores and the occurrence of clauses was only significant with the teacher's ratings. In general, the memory data show that the children seemed to be sensitive to the size of the stimulus sets when studying. In addition, the children's accuracy in free recall was affected negatively by the interrupted interval; however, their accuracy in recognition was not notably affected by the interruption during the pre-test interval. The only significant correlation between the children's reading readiness and memory was in the time they used to study stimulus sets. This correlation was noted only with the stimulus sets that consisted of five pictures. Although none of the other measures of memory were significantly correlated with reading readiness, some implications for future research are considered.

### Reading Readiness Measures

The measures of the children's reading readiness, provided by the TERA and teacher's ratings, were not significantly correlated with each other. It is important to note that the TERA scores are age-adjusted whereas the teacher's ratings are not. The children were of an average population in terms of their reading readiness level as indexed by the TERA; however, the teacher's ratings were slightly above the mid-point on the rating scale. As Table 2 shows, the teacher's ratings are significantly correlated with age. This might suggest that the teacher may have rated the children's readiness ability on the basis of age or some unknown third factor that also may be correlated with age. Although it is known what the TERA measures, the teacher's rating is a very different measure. Thus, it may be that each measure examined different aspects of reading readiness. For example, the TERA examines such things as book orientation or familiarity with orthographic conventions (e.g., left-to-right, top to bottom); however, it does not examine children's understanding of the grammatical structure in the English language. The teacher may have based her ratings on more verbal aspects and ignored the physical aspects involved in reading such as book orientation. It is important to keep this variability in the reading readiness measures in mind when examining the relationship with the other variables.

### Reading Readiness and Intelligence

As the results indicate, the children's standard score or I.Q., as indexed by the PPVT-R, is significantly correlated with both measures of the children's reading readiness. This supports the hypothesis that reading readiness is related to intelligence. The mean of the children's standard scores was 110.46 (S.D. = 14.19) on the PPVT-R. Because this is slightly above mid-average, it may suggest that the children chosen for this study may not have been within the normal range of the



general population. This effect may be due to the commitment the children's families have towards education. The possibility that other variables are significantly correlated with intelligence also exists. However, although the children were slightly above mid-average mental ability, they were within the normal range in terms of their reading readiness, as indexed by the TERA. It seems likely that although intelligence is related to reading readiness, intelligence or ability may not subsume the other variables examined by the TERA. Furthermore, the teacher's ratings also were slightly above the mid-point on the 7-point rating scale. As a result, this may suggest that the teacher also rated the children in terms of general ability rather than reading readiness.

The above results support the findings of past research (e.g., Smith, 1973, cited in Howarth, 1984; Kaufman, 1979; and Robertson & Eisenberg, 1981) that intelligence is related to reading readiness. Thus, it is not unreasonable to assume that children, at the kindergarten level, who are more ready to begin reading will presumably have a higher I.Q. However, it is uncertain whether or not this relationship continues as the child learns to read. In a longitudinal study examining children at the pre-kindergarten level and later at the grade three level, Badian (1986) found that a small number of children scored above average on the intelligence screening test yet experienced difficulty in reading in grade three. Badian suggested that this was partly because, based on Stewart's findings (1978, cited in Badian, 1986), these children were either dyslexic or had a reading disability of some nature. Thus, although reading readiness appears to be significantly correlated with intelligence, it may be that this relationship may change as the children learn to read. This possible change in the relationship may be due to the effects of children with a learning disability, related to reading, that as yet has been undetected. It may also mean that some specific cognitive ability or skill that predicts reading difficulty may be low in these children.

### Reading Readiness and Verbal Fluency

A significant correlation was noted between reading readiness and the two measures of verbal fluency. In examining the children's verbal fluency, as measured by MLU, a relationship was noted only with their reading readiness, as measured by the TERA. However, the children's verbal fluency, as measured by the sum of clauses, is significantly correlated with the teacher's ratings of the children. Consequently, although a relationship was found between verbal fluency and reading readiness, there appears to be some discrepancy. This discrepancy may be because the teacher is sensitive to the children's language skills. Rather than stating that a relationship does not exist between verbal fluency and reading readiness, it should be kept in mind that the children's verbal fluency was measured two ways, and both measures were significantly correlated with one of the reading readiness measures. Therefore, it seems likely that verbal fluency is important in the beginning stages of reading; however it is uncertain to what extent this is necessary. This finding is similar to Downing and Thackray's (1972), Bullock's (1979) and Holdaway's (1979) views that suggest children need to be verbally fluent in order to see the relationship between oral and written language. This was presumed to be important because reading is one aspect of communication as is oral language. Moreover, the complexity of children's oral language is important in learning to read (e.g., Holdaway, 1979). The measurement of MLU and the occurrence of clauses in children's speech presumably indicates whether a child lacks the knowledge of grammatical structure in the English language or may be speaking a dialect other than standard English, as suggested by Downing and Thackray (1972). Because both of these measures are significantly correlated with at least one measure of reading readiness, it seems likely that verbal fluency is an important factor in beginning reading.

The aforementioned discrepancy in the results between verbal fluency and

reading readiness could be due to the possibility that the children were providing only a summary when telling their stories. As a result the children may not have made their stories as complex as they might normally produce. Presumably the teacher rated the children on their natural speech; therefore, what the children presented to the examiner may not have been indicative of this. Although this method was effective in the study by Sachs and Devin (1975), better scores might have been achieved had the children spoken to a real child rather than pretending the "Cabbage Patch" doll was real. While the children were telling their stories, it seemed apparent that they did not see the doll as real. This was evidenced by the lack of eye contact, gestures and the direction of their verbalizations to the doll.

#### Reading Readiness and Story Knowledge

Related to verbal fluency in its relationship to reading readiness is story knowledge. Story knowledge as measured by the number of core statements the children used in telling their stories was significantly related to both measures of reading readiness. As suggested by Snow and her colleagues (1985) and Young (1983), story knowledge is hypothesized to be important in the acquisition of reading. The results of the study proper are consistent with the view that children require story knowledge in learning to read. A relationship was thought to be important because children's first experiences in reading are with stories. For example, this would include stories that are read to the child, or those he/she reads to him/herself. Furthermore, based on the findings of the study proper, it is important for children to have some knowledge of story structure in order for them to have some understanding of what they are required to read. This also ties in with the need for children to have acquired some level of verbal fluency.

### Study Time

The results show that children seemed to be sensitive to the size of the stimulus set. This would suggest that although the correlations generally are not significant between reading readiness and study time, these children on average are aware of a relationship between study time and the nature of the material to be learned. Thus, although the literature suggests that young children are incapable of employing a verbal rehearsal strategy, these children have at least developed the knowledge of a correlation between the amount of time they study material and the stimuli they are required to learn. It is also possible that fatigue may have affected the children's use of study time at the end of the memory test, given the fact that the mean study time during the interrupted interval increased very little relative to the other test trials. The results might have been different had the uninterrupted and interrupted intervals of the memory test been randomized. In addition, the children may have overestimated their study time at the beginning of the test and as a result less time was needed later on in the test. It should be noted that very few of the children in the present study showed overt evidence of rehearsal activity. One child could be heard whispering the stimuli words and another commented, "I'm saying them over and over so I'll remember them", although this was not observed over all trials with either child. This might further suggest that although these children did not appear to make use of a verbal rehearsal strategy on a consistent basis, they may be at a level just prior to developing such a strategy.

### Recall

The data show that the interruption during the pre-test interval has an effect on the children's accuracy in free recall. Because this effect was found, it suggests that these children are able to employ a rehearsal strategy at least to some extent.

Presumably verbal rehearsal will be prevented if the child is required to perform verbal tasks (cf. Klatzky, 1975). Because the data show that these children performed better on the free recall task when the interval was left unfilled, it suggests that children are able to employ a rehearsal strategy when learning stimuli. Had the interruption not affected their level of recall, then it would be clear that a verbal rehearsal strategy was not employed.

It should be noted, however, that the children were only able to recall up to a maximum average of 2.19 pictures. Myers and Perlmutter (1978) found that children, slightly younger than the children in the study proper, were able to recall an average of 3.4 items. Clay (1979a) found that when young children were shown a picture with the corresponding beginning letter and later asked to recall the letter, some were not able to respond verbally; however, they were able to draw the letter in the air without assistance. This might suggest that young children although unable to verbally recall the stimuli, are able to visualize the stimuli. This might explain the low ability scores in the free recall test. In addition, Einstein, Pellegrino, Mondani and Battig (1974, cited in Johnson, 1980) found that children were more accurate in free recall when the stimulus items were presented individually rather than simultaneously. Because the stimulus items were presented simultaneously, in the study proper, it may have affected the children's recall ability. Thus, although the data show that the children may have made use of a verbal rehearsal strategy, they were unable to do so efficiently.

### Recognition

The results suggest that children were close to ceiling in their performance levels. This finding is consistent with past research. For example, Myers and Perlmutter (1974, cited in Myers & Perlmutter, 1978) found that recognition is excellent in children as young as 4.5 years. Children of this age could recognize up to

92% accuracy on stimulus sets of 18. This would explain the ceiling effect obtained in the study proper. Because of this, it seems likely that larger stimulus sets of pictures would have been more appropriate with this age level of children.

Although the interrupted interval does not affect the children's accuracy in recognition, a nonsignificant effect is noted on the stimulus sets of 4 and 5 pictures. The finding that recognition is not affected by the interruption interval is consistent with past research. For example, in the study conducted by Shepard (1967, cited in Klatzky, 1975) subjects could still recognize more than 50% of previously presented items 120 days after initial presentation of the stimulus. Thus, it seems likely that interruption during the pre-test interval has no effect on recognition performance, at least with the set sizes used in this study.

#### Relationship Between Reading Readiness and Study Time, Recall and Recognition

In general, the relationships between the children's reading readiness and memory were insignificant. The only significant data in the relationship was between reading readiness, as measured by the teacher's ratings, and the time the children used in studying stimulus sets of five pictures. The inconsistent data may be a result of the children not fully understanding what was required of them. Although the children were given one training session, this may not have been sufficient for them. When the children were required to learn the stimulus sets of five pictures, they may have been close to understanding the test requirements. The test trials were not randomized, in terms of the size of the stimulus set as well as the condition of the interval. The children may have viewed the set of five pictures as a relatively difficult task. However, immediately following this task, the children were once again asked to learn a stimulus set of three pictures. Thus, they may have seen this as a much easier task and therefore misjudged the time needed to study the stimuli. This might further suggest that these children were too young to have

developed efficient study strategies. Because an inconsistent relationship was noted between the children's reading readiness and their study time, it may suggest that although these children may have been too young to utilize study time to their benefit, those children who were able to, however inconsistently, are beginning to see this relationship. In addition, it would be of interest to examine the same children at a later time to determine if this relationship is more significant after children learn to read.

No significant correlation between the children's reading readiness and their accuracy in free recall and recognition was found. Because the children's performance on none of the trials correlated significantly with reading readiness, it might suggest that rehearsal strategies only become necessary after children have begun to read. The results suggest that children at kindergarten age are unable to make use of a rehearsal strategy on a consistent basis. This finding would support the findings of past research that have suggested young children are unable to rehearse. Again, it would be of interest to examine the free recall and recognition ability in the same children after they have learned to read. Therefore, it may mean that reading ability rather than reading readiness is associated with recall and recognition performance.

## CHAPTER SIX

### CONCLUSIONS, IMPLICATIONS AND FUTURE RESEARCH

#### Conclusions

This thesis examined the relationship between reading readiness and children's intelligence, verbal fluency, story knowledge and memory ability. In general, selected variables that were deemed necessary in the beginning stages of reading were examined.

The present study provides support for the hypotheses that relationships exist between reading readiness and children's intelligence, verbal fluency and story knowledge. It is uncertain whether an environment that will enhance these variables will at the same time enhance reading readiness. However, it seems likely that children need experiences in order to develop their oral language and story knowledge.

Because the findings do not support the hypothesis that reading readiness is related to study time, accuracy in free recall and recognition, it seems apparent that children at kindergarten age are unable to employ a verbal rehearsal strategy on a consistent basis. These findings are consistent with past research that has suggested children do not begin to develop the ability to rehearse until they reach the age of 8 or 9 years (Bebko, 1979; Ornstein et al., 1985).

#### Implications

The implications for theory lie in an explanation of what reading readiness entails. It is clear that children need to have developed verbal fluency as well as some knowledge of story structure. In addition to this, reading readiness requires



some level of ability. Although this may not be something that can be taught, it seems likely that stimulating experiences will aid this development (Skeels, 1966). Therefore, rather than looking at beginning reading as a rigid process which all children must go through at the same period of time in their life, the individual ought to be examined more closely, given the results of this study. This suggests that children who are lacking in these variables might benefit from additional stimulation in the areas of oral language and story knowledge.

### Future Research

Some implications for future research are suggested as a result of this study. For example, this might include a longitudinal study examining the same children. By doing this, it could be determined whether differences in the children's reading readiness affect them throughout their grade school years, or if this is just a developmental lag. If it is a lag, the children who scored low on the TERA, will have "caught up" with their peers at a later point in time. In addition, future research examining children at the kindergarten level as well as the same children after they have learned to read may provide more evidence that rehearsal strategy not only develops over time, but coincides with learning to read. When examining the younger children it would be of interest to make the memory test more difficult and see if a relationship exists. Because the children in the present study almost reached ceiling on the recognition task, it might mean that the task may need to be more difficult in order to be related to reading readiness.

Another topic for further research would involve taking a closer look at how reading readiness tests compare to teacher's expectations of their students at a given time. The variables found to be significantly correlated with both measures of reading readiness used in this study may be the ones to examine more closely and thus determine if a more appropriate measure of reading readiness can be developed.

In addition, environmental intervention with any one of these variables or skills may also provide additional information, and therefore ought to be studied over a longer period of time. This might include examining whether or not these variables can be changed and as a result improve reading readiness, or whether acquiring reading related skills will improve the variables examined in this study.

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## **APPENDIX A**

### **CONSENT PROCEDURES**

Given the ages of the children and the fact that they were tested in the school setting, consent was obtained from three parties: (1) the school, (2) the parents and (3) the child.

In order to obtain consent from the school, the research proposal was submitted to the school's education committee. When they agreed to have research conducted in the school, they took the matter to the board for approval.

When the board approved the project, a letter was sent to each parent. The letter explained the aim of the study, described the procedure, assured the parents of the confidentiality of the data, outlined the researcher's qualifications, and requested their consent to have their child participate in the study.

## APPENDIX B

### STIMULUS SETS AND DISTRACTOR ITEMS FOR REHEARSAL TEST

#### Stimulus Sets

##### Uninterrupted Condition

##### Stimulus Set of Three Pictures:

Trial 1: man  
box  
tree

Trial 2: flower  
blocks  
chick

##### Stimulus Set of Four Pictures:

Trial 1: bird  
chair  
mask  
cup

Trial 2: balloon  
dog  
hammer  
kite

##### Stimulus Set of Five Pictures:

Trial 1: sock  
nest  
tent  
coat  
doll

Trial 2: yo-yo  
bat  
candle  
turtle  
elephant

##### Interrupted Segment

##### Stimulus Set of Three:

Trial 1: bowl  
house  
pail

Trial 2: snowman  
plant  
foot

##### Stimulus Set of Four:

Trial 1: skates  
clown  
bear  
hat

Trial 2: car  
present  
bottle  
crayon

##### Stimulus Set of Five:

Trial 1: truck      pan  
sun              ball  
block

Trial 2: carrot  
wagon  
pencil

tricycle  
sandwich

## Distractor Items

Uninterrupted ConditionStimulus Set of Three:

<u>Trial 1:</u> jug	sheep
can	butter
fork	balloons
apple	glasses
peanuts	ice cream cone

<u>Trial 2:</u> fish bowl	banana
tea pot	muffin
dime	pig
dice	cat
boat	shovel

Stimulus Set of Four:

<u>Trial 1:</u> car	mug
toboggan	book
chicken	umbrella
football	doll
star	ball

<u>Trial 2:</u> bicycle	ship
clock	cake
rabbit	top
pumpkin	squirrel
drum	snake

Stimulus Set of Five:

<u>Trial 1:</u> sock	whistle
elf	sailboat
daisy	racquet
scissors	mitten
bee	mouse

<u>Trial 2:</u> penny	windmill
paddle	woman
hat	glass
frog	boots
moon	heart

Interrupted ConditionStimulus Set of Three:

<u>Trial 1:</u> bus	table
key	stove
leaf	axe
lion	corn
pie	Christmas tree

<u>Trial 2:</u> rake	airplane
knife	wheel
spoon	lamp
bread	ring
meat	rainbow

Stimulus Set of Four:

<u>Trial 1:</u> zipper	window
vest	swing
queen	crib
monkey	fire
saw	comb

<u>Trial 2:</u> shoes	rope
bed	button
train	mop
ladder	log
tie	butterfly

Stimulus Set of Five:

<u>Trial 1:</u> skunk	church
cane	jack-in-the-box
fence	brush
ant	door
cow	bone

<u>Trial 2:</u> nail	bow
cheese	hand
spider	nurse
duck	barn
cherries	sea shell